



Case study of ore processing

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Work load 50h: 10 h lectures and 40 h practical work and exercises

Number of credits: 5ECTS

Course code: 8KUEVN27

► Objectives:

1. Development of a flow sheet for ore processing taking into account the geology and mineralogy considerations.
2. Analyze the results of a separation process in order to optimize them.
3. Acquire experience in ore preparation and separation at lab and pilot scale.

► Contents:

1. Physical separation pilot plant work

- Dense medium separation for the determination of liberation degree of ore
- Size reduction methods: jaw, roll and gyratory crushers. Ball mill
- Concentration methods:
 - gravity separation : jig, shaking table, Falcon:
 - magnetic separator: low , medium and high intensity with electromagnetic and permanent magnets systems
 - electrostatic separator
 - Flotation equipments : lab and pilot scale

2. Flotation pilot plant work

- Flotation of a Pb-Zn ore. Material balance and reagent evaluation
- Case study: flow-sheet development for processing a W-Sn ore



- Continuous pilot test : flotation of iron or manganese ore flotation
 - o Flow sheet development, choice of reagent
 - o Pilot test in mechanical flotation machine or/and column flotation
 - o Sampling procedure.
 - o Calculation of material balance of flow sheet (solid and water) using BILCO Software
 - o Scaling of ball mill based on the sampling campaign and using the USIMPAC software
 - o Work report and defences.

If pilot plant work is cancelled (miss of materials or technical issues) alternative option is proposed to collect the data for the materials balance calculation and scaling up of the equipments. .

2. Personal project by team of 2 students on the development of a flow-sheet to process a particularly type of ore (polymetallic, Cu-Mo porphyry, iron ore, etc.) based on the laboratory scale flotation test.

► *Prerequisites:*

Mineral processing basics, material balance, equipment.

► *Form of Exam:*

Personal project: (team of 2 students) evaluation by a reviewer and oral presentation.
Final report on pilot plant work.

► *EIT Overarching Learning Outcomes (OLOs)*

- OLO 1: Study of plant techniques and analysis of plant data
- OLO 3: The ability to design and critique mineral beneficiation plants
- OLO 6: Acquire experience in ore preparation and separation at lab and pilot scale
- OLO 7: Motivation of a leader mentality within their groups